

White Tower Shop Renovation, HM Tower of London



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May 2016

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1. **Location and Scope of work**

The White Tower shop is located in the western room of the White Tower basement, and in the first quarter of 2016 a renovation project was undertaken to improve the design and layout of this retail space. Included within the refurbishment was the replacement of six concrete areas situated within the recesses in the shop area located along the east and west walls (Fig 2). The project proposed to replace the modern concrete with Yorkstone paving to match the rest of the flooring, which required a shallow excavation to a depth of around 0.24 m. As a consequence and as part of the requirements of the project an archaeologist was present during the course of this phase of the works. The potential for archaeology in this area was high, so the excavations needed to be monitored closely and a preliminary trial trench excavated to determine the depth of any underlying archaeological features.

Other elements of the project, which included the installation of new display units and new lighting, were designed to have no impact on the historic fabric. The only exception was the re-location of some of the Royal Armouries' display objects which involved the insertion of supporting brackets into the mortar joints of some walls. However, it was ensured that little of the fabric was affected by this alteration. This part of the renovation project did not require archaeological monitoring.

The removal of the existing shop fittings allowed for photographic recording of the space before the installation works began. This, along with the archaeological monitoring, will be of use for HRP's curatorial department and help to improve our records of the White Tower.

An application for Scheduled Monument Clearance at HM Tower of London was granted by Historic England for the proposed scheme of works. It is part of the Historic Royal Palaces' commitments and conservation principles as well as a condition of consent that a qualified archaeologist be present during the excavation of the trenches.

The site code assigned to this project was TOL 154.

2. **Aims and Methodology**

Aims

The aim of this watching brief was to record any archaeologically significant features or structures as well as to ensure that the fabric of the White Tower basement sustained no damage. Archaeological horizons and features were recorded as part of on-going research into the history of the Tower of London, with the hope of expanding our understanding and knowledge of the White Tower's evolution.



Conservation is the overriding priority in all of HRP's aims and objectives; guided by strict in-house Conservation Principles. These include a commitment to the continued use and occupation of the palaces, but with minimum intervention to historic fabric. Any interventions are preceded by informed research and study of the physical and documentary evidence, and meticulous recording of the fabric before, during and after all work.

The White Tower shop work is intended to provide a more-modern and well-designed retail space to help support HRP's wider activities.

Methodology

During the White Tower Shop renovation works an archaeologist was present to monitor the removal of the concrete situated in the 6 bays of the western basement area. The concrete was broken using a hand-drill and the rubble below removed to the depth necessary for the installation of the Yorkstone slabs. However, due to an unexpected archaeological discovery exposed during the excavation of a small test trench in Bay 1 (south-western bay), five areas were pinpointed for further investigation. The number of areas and extent of the excavation depended upon time constraints and as far as possible would not interfere with the White Tower Shop renovation project's schedule. The archaeological work, therefore, was carried out in-sync with the removal of the concrete.

During the course of the works, if any other archaeologically significant horizons were identified the archaeologist took over the excavation and the work was paused to allow for recording. However, the works were able to continue elsewhere in the basement, resulting in minimal disruption to the progress of the renovation works. Where necessary an area containing potentially significant archaeological remains was further explored and the excavation area extended in order to gain a clearer understanding of the vestiges still present beneath the surface.

Any archaeological levels, features or structures were cleaned using appropriate hand tools and recorded in plan at 1:20 and/or in section at 1:10, as appropriate. Digital SLR photographs were also taken as part of the record. A written description was carried out using HRP Pro Forma context record sheets. A unique-number site code was allocated to this project (ToL 154) and has been used to identify finds and archival material resulting from the project. Any finds recovered were exposed, lifted, cleaned and conserved and will be housed by Historic Royal Palaces and accessioned into the permanent collection.

The excavation did not extend beyond the required depth for the installation of the stone slabs unless prior consent was given from the project manager and Historic England. Any further investigation was carried with the intent of enriching our understanding of the White Tower's history and evolution, but was limited to exposing the archaeological



remains in plan, except in those areas where more extensive investigations were both necessary and were agreed to by all those concerned.

3. Historical Background

The Tower of London

The building of the Tower of London was begun shortly after the Conquest by William the Conqueror, whose great keep, the ‘White Tower’, sits at its heart. The fortress was first constructed within the south eastern corner of the ancient Roman city walls, along the riverbank of the Thames. Extended beyond the boundaries of the Roman city walls by Henry III, and developed as a concentric castle by Edward I in the 13th century, the Tower – the monarch’s stronghold amidst an often hostile city – became the home of major State Institutions such as the Royal Mint, as well as the setting for nationally significant historical events. The Tower is the home of the Coronation Regalia and Crown Jewels, and the Royal Armouries Museum, which still displays part of its collection within the White Tower. The fortress is most strongly associated in the popular imagination with the Tudors, and the turbulent events of the 16th century, particularly with the many prisoners kept within its walls. The 19th century Romantic perception of the Tower, and the castle’s emerging identity as a tourist attraction, led to the demolition of many institutional structures and the addition of new ‘medieval’ style neo-gothic buildings.

The Significance of the White Tower

The White Tower is an outstanding survival of Norman keep architecture in England. Begun shortly after the Conquest, dendrochronological analysis has shown that building work on the White Tower was well underway by 1075-9. The imprisonment of Bishop Ranulf Flambard in 1100 in the White Tower suggests that it was fit to house a high status occupant by this date. The tower is a premier example of a Norman fortress palace of immensely sophisticated design. It is the most complete survival of an eleventh century fortress palace remaining in Europe. The solidity of its structure and the use of masonry rather than timber demonstrated to the subjugated English the wealth, power and longevity of the Normans. The White Tower had a tripartite role, to impress and dominate the unruly citizens of London and those arriving in the kingdom up the Thames River, and to provide a formal residence for the King. The residential elements, such as the garderobes, fireplaces, and the royal chapel of St John the Evangelist are amongst the finest and most complete examples of their kind. The latter is a unique survival of an intact royal, eleventh century palace chapel. The White Tower had a symbolic role to play as part of the Conqueror’s gateway to the kingdom. The elaborate imposing elevations suggested to newcomers arriving up-river a massive structure of three storeys, but in the Norman period there were in fact only two



(excluding the basement). The ‘third storey’ was indicated by a series of small arched windows, visible on the exterior. However, these windows lit a mural passage which overlooked a roof covering the third storey. The area now occupied by a fifteenth century top storey was in fact an unroofed shell designed to create an illusion of even greater height and solidity in the original building.

The Basement Galleries and Shop Area

The Norman basement consists of a large western room, currently occupied by the White Tower shop, with an area to the south used as exhibition space, a medium sized eastern room, and a small south-eastern basement room with a semi-circular east end mirroring the floor-plan of St John’s chapel, which is two stories above. The western and eastern rooms are characterised by the massive brickwork groin vaults springing from spur walls. The vaults were inserted in 1732-34 to improve conditions for the storage of gunpowder and saltpetre by the East India Company in the basement. The wooden door between the east and south-eastern rooms has been dated using dendrochronological analysis to c1350. The south-eastern room retains its Norman stonework interior, with a large window embrasure to the east, and a stone foundation plinth exposed at floor level. Sections of the historic floor beneath are displayed in-situ through glass. The original 11th century well of the White Tower is situated in the western room.

Previous Archaeological Excavations

As far as we know, previous archaeological investigations in the western part of the White Tower basement relevant to this project can be traced as far back as the 1960’s. A small collection of photographs in the Historic England archives (AL 1087) show that small scale excavations were carried out in 1968. The works appear to have focussed on the still-in-situ Yorkstone paving in the White Tower shop. The images (Fig. 13) suggest that some limited archaeological recording was undertaken as part of this work; however no written record of this excavation has been identified despite the photograph captions referring to “Tudor wall footings in the Cannon Room”.

An archaeological Watching Brief was undertaken by Oxford archaeology in 1998 during the excavation of a lift pit in the west basement of the White Tower, ToL 75. A north-south aligned brick wall was exposed at the western end of the pit. This was interpreted as a post-medieval spine wall running along the west basement and would seem to correspond to wall 1024 found during the ToL 154 project. It was suggested that it was somehow related to Lemprière’s cross-section through the White Tower in 1729 clearly showing posts rising through all levels of the western half of the building, and that it may be a sleeper wall used to support these posts. It was also suggested that the wall may date to the 17th century based on the morphology of the bricks, but given the additional information gathered during the present project this tentative claim can be contested.



4. Description of Findings

Summary

The western side of the White Tower Basement is today divided into 8 rectangular bays with a central walkway, with the two northern-most bays being separated by the doorway. For the purpose of this archaeological investigation, these spaces were numbered as Bays 1 – 8 (Fig. 2). Archaeological investigation was carried out in Bays 1, 2, 3, 4 and 5. A total of 69 archaeological contexts were recorded (1000 – 1069).

Initially a small section of concrete was removed in Bay 1 in order to observe what lay directly beneath the current floor level. Beneath the concrete floor was a layer of brick rubble (Contexts 1000, 1021, 1022, 1045, 1067), which seemed to correspond to a contemporary levelling layer. However, some of the bricks seemed Tudor in appearance so in order to ascertain that there was no risk to potential archaeology it was necessary to open up a larger area. Therefore, a 1 metre square trench was excavated situated 0.73 m south of the northern pier in Bay 1. This would determine whether there were any archaeological features hidden beneath the rubble layer.

Upon cleaning the small trench the presence of a linear brick structure quickly became apparent 24 cm below the current floor surface at 8.13 m OD. This unexpected find clearly needed further investigation and once the demolition of the concrete floor was given the go-ahead it was simply a matter of widening the working area within the confines of Bay 1.

A strategy was needed in order to make the most of a rare opportunity to observe new archaeological data in the white tower Basement, as well as to ensure that there would be no interruption to the wider project schedule.

Using the Board of Ordnance plans of the basement from 1729 (TNA Work 31/83) (Fig. 15), features were identified which could correlate with the discoveries made in Bay 1. Later additions to the plan have also marked out the vaults that were inserted into the basement in 1734. The correlating feature was one of four linear features running north-south in the western section of the basement. One of these features seemed to be on the same alignment as the structure exposed in Bay 1. Based on this observation, it was agreed to focus on specific and strategic areas of the basement in order to see if this was indeed the case (Bays 1, 2, 3, 4, and 5). This strategy would have been re-evaluated should any further unexpected discoveries have been made.

The investigations focussed on observing and recording the archaeology in plan, however, in order to determine the nature and depth of the features exposed, two sondages were excavated: one in Bay 1 and another in Bay 2.



The description of the archaeological features which follows is written chronologically. It is not an exhaustive description of every context as this was not deemed necessary, but a full list of contexts with a brief description can be consulted in Appendix 1.

Medieval Phase

Very few medieval vestiges were observed during the works, however in Bay 2, the original limestone lining of the 11th century well was partially exposed (Figs. 7 & 8) showing that the Tudor wall (**1023**) had been built around it. The topmost part appeared at 8.14 m OD but the structure was only seen over a distance of 0.56 m and excavated to a depth of 0.3 m, therefore little else can be said about the well, although it does seem to have remained exposed at this level during the Tudor period as it is abutted by the possible Tudor floor level, **context 1025**, which is described in section 4.4, leaving 10 cm of exposed stonework.

In Bay 3, a curious north-south linear feature composed of large roughly hewn limestone blocks is situated against the western wall of the White Tower (Figs 9 & 10). It was observed along a distance of 0.8 m, a width of 0.34 m and had a total depth of 0.18 m. It appears to have been partially removed at the southern end as there is a linear trench extending beyond the line of stones on the same alignment, which may correspond to a robber trench (**1039**), described in section 4.4. The stone blocks are bonded together by coarse yellow sandy mortar. It is not known what this feature's function was or indeed its date, however, based on the construction material it has been placed chronologically prior to the Tudor period.

Tudor Phase

Structure 1008 refers to a north-south aligned wall unveiled along the western side of the White Tower Shop area in line with the eastern end of the 18th century piers (Figs 3, 4, 5, and 13). This wall was observed in Bays 1, 3 and 5 over a length of 12 m and although the extent was never revealed due to both time restrictions and the scope of the floor renovations, we can be fairly certain that it originally extended to both the northern and southern end of the western basement area. This wall perfectly matches the alignment of the feature shown in the Board of Ordnance map discussed in section 4.1 (Fig. 15), which extended from the southern to the northern end of the White Tower.

The wall is 0.48 m wide and has been finely built using Tudor stock bricks measuring 0.22 m x 0.1 m x 0.05 m. It has two faces presenting English Bond brickwork with thick layers of fine sandy lime mortar of up to 2.5 cm thick between the bricks - a feature typical of Tudor construction. Only the western face (Fig. 3) could be observed as the eastern face was too close to the edge of excavation and a wall built in the 1960's ran parallel just a few centimetres to the east (**context 1013**). Given the fine construction of this wall it seems that the upper portion must have been exposed. It has been truncated at 8.13 m OD and the presence of mortar on the surface of the structure suggests that it



continued upwards, though a lack of records means that its full height will remain unknown. The wall was consistently truncated by the construction trenches of the 18th century piers (**contexts 1009, 1011, 1037, and 1054**).

In Bay 1 an extended sondage measuring 1.6 m x 1 m was excavated in order to determine the depth of the wall and to gather further information on the nature of its construction.

Wall 1008 has been trench built and the construction cut, **context 1003**, was visible on the western side of the structure at a height of 7.82 m OD, just below the first off-set of the wall. It has a depth of approximately 0.56 m with a width of 0.1 m from the western side of the wall. The backfill, **context 1004**, is composed of loose dark brown to grey silty sand with occasional inclusions of mortar flecks, small pebbles and stones. No finds were recovered in this deposit.

The wall is a substantial construction plunging 0.74 m in depth to 7.39 m OD. It is composed of three separate sections including the elevation, **context 1001**, and two off-set foundation levels, **contexts 1006 and 1020** at the base. There are 12 courses of bricks in total. The top three courses, amounting to a total of 0.2 m, are by far the most immaculate-looking and seem to correspond to an elevation. The mortar joints are neater compared to the rest of the construction and the bonding material is composed of a fine greyish yellow sandy lime mortar containing fine gravels.

The middle section of the wall is the most substantial and is composed of 6 courses of bricks measuring a total of 0.3 m in depth (**context 1006**). Apart from the very top course of this section, which may have been on display when this wall was in use, the finish on the western face is less fine at this level. The mortar tends to partly shroud the bricks and is a little thicker, although the brickwork is consistent. This context is off-set from the upper part of the wall by 0.02 m and measures a total estimated width of 0.51 m.

The lower portion of the wall, **context 1020**, is off-set by a further 0.04 m and is composed of 3 courses measuring 0.22 m in height with an estimated width of 0.57 m. This footing has a cruder appearance with a much thicker and harder mortar used between the joints. The mortar here is greyish white in colour with a high quantity of coarse gravels and small stones which in places seems to be covering the softer, sandier mortar in the bed joints. Perhaps this more solid mortar was used to consolidate the base of the wall?

In plan, it was possible to observe the core construction of the wall, which alternates between a central line of bricks lying on bed perpendicular to the outer bricks, and a layer of two aligned bricks displaying headers on both faces.

In Bay 1 an interruption in the surface of the wall was observed, measuring 0.45 m in width, with a depth of 0.09 m (Fig. 4). Although the southern edge is less so, the north



side of this interruption is regular and may indicate the existence of a feature built within the wall, perhaps an upright structure of some kind. While this interpretation is conjectural, the feature does appear to be in an appropriate position for such a structure as marked on TNA Work 31/84 showing a series of square features within the walls that seem to correspond to the location of uprights or postholes. No postholes were revealed along the excavated sections of the wall, and this particular element located in context **1001** is the closest match found.

Wall 1008 was also observed in plan in Bay 3 (1034) and Bay 5 (1019) where the same general characteristics and stratigraphic relationships were noted.

Running parallel around 4 m to the east is **wall 1024**, which was observed in Bays 2 and 4 over a length of 5 m (Fig 2). Like **1008**, it is presumed that it ran the whole length of the basement, systematically truncated by the construction trenches of the 18th century piers **contexts 1026, 1048**. The width of the wall was not observed however, as it was partially hidden by the limits of the excavated areas underneath the Yorkstone slabs.

Wall 1024 is comprised of **contexts 1023** and **1046**. No construction cut was noted, but this does not necessarily mean that the wall was free-standing; the cut may simply not have been visible in the limited confines of this excavation area. In Bay 2, the wall was built to fit around the medieval well construction **1031** and does not appear to have damaged the fabric of this earlier feature. A small sondage was excavated measuring 0.25 m x 0.30 m with a depth of 0.30 m. It revealed the extent of the wall which is much less substantial than **1008**, with five courses of brick 0.36 m deep in total at a height of 7.87 m OD at the base, and 8.17 m OD at the top. There was no offset and no clear division between the foundation and the elevation; hence the reason only one context was allocated. The eastern face of the wall was observed and is constructed in the same way as **1008**. There is a significant fracture in the wall from top to bottom where it meets the well structure **1031**. No construction cut was observed, but deposit **1033** corresponds to the backfill around the wall construction and is composed of loose silty sand with occasional small stones and fragments of CBM, though no finds were uncovered. This deposit is overlain by a potential Tudor floor level, **1025**, which abuts **elevation 1023** (Fig. 7).

Bay 4 was the last area excavated and unfortunately due to the time constraints only a small area could be opened up to reveal the surface level of the archaeology. Nevertheless, **wall 1024** was observed in plan, (**context 1046** – Fig. 12) and was seen at a height of 8.18 m OD. Here it was associated with **context 1050**, a single limestone slab or tile, which is described below.

The possible remains of Tudor floor levels were observed in bays 1, 2 and 4. In Bay 1 this consisted of a patchy and insubstantial layer of powdery lime and mortar, **context 1061**, which appeared at 8.07 m OD. On its own this context would have meant very little but because in Bay 2, a more substantial layer, **context 1025**, was uncovered it was possible to make a tenuous connection. **Context 1025** (Fig. 7), at a height of 8.03 m



OD, abuts **wall 1024** and is composed of greyish brown fairly loose silty sand containing frequent patches of lime and small fragments of mortar comparable to **1061**. There were also occasional fragments of wood, small sub-rounded stones, fragments of CBM, including tile and one or two substantial blocks of limestone visible on the surface. The presence of lime and fragments of mortar may suggest that this and **context 1061** are the remains of a preparation layer for a floor surface. This layer also abuts the medieval well, but is less well conserved in this area.

In Bay 4 a single limestone slab or tile was discovered (**context 1050** – Fig. 12) at a height of 8.13 m OD, 6 cm higher than the possible preparation surface next door in Bay 2. The thickness of this slab was not observed but the heights would seem to correlate if the previous contexts described do indeed correspond to preparation layers. Unfortunately further excavation of this area was not possible due to time constraints.

18th Century Phase

The 18th century vaults and associated piers were installed in 1732-34. They each have clear construction trenches, seven of which were observed during the archaeological investigation (**contexts 1039, 1037, 1009, 1011, 1054, 1026 and 1048**). They measure between 0.45 m and 0.60 m wide and have been backfilled by loose, mid to dark brown sandy silt with pockets of compact clay and occasional inclusions of CBM, small angular stones and flecks of mortar (**contexts 1038, 1010, 1012, 1027, and 1049**). The depth of this top fill is unknown as it was not excavated. They systematically and clearly truncate the Tudor walls **1008 and 1024**.

The foundations of the 18th century piers were recorded in Bays 1, 2 and 3 (**contexts 1017, 1030 and 1060**). Only the upper courses were observed and the depth of the foundation is unknown, but the top 7 courses at least were constructed with an English bond brickwork pattern. In Bay 1, the foundations were observed to a depth of 7.77 m OD over seven courses (Fig. 6). The top two courses of bricks are badly conserved with a number of fractures and breaks; they are also slightly larger in size than the bricks below with an average size of 0.09 m x 0.24 m. The courses below are composed of red bricks measuring an average of 0.5 m x 0.21 m x 0.1 m, which is consistent with Tudor stock bricks. It is possible that they originate from the demolished section of these earlier Tudor walls and thus part of the foundation was built with re-used bricks. The joints between the bricks are thick measuring up to 4 cm in places. The bonding material is composed of coarse greyish yellow lime mortar with coarse gravel inclusions as well as some coal inclusions.

In Bay 2 four courses of bricks were observed (**context 1030**) but the bricks used to construct the foundation seem to be different from those observed in Bay 1 as they are more pinkish in colour and are slightly thicker measuring on average 0.07 m in depth. The joints and bonding material, however, are consistent with **1017**.



In Bay 3, the pier was observed along its length measuring 2.34 m together with the thick modern concrete render (context **1069**) and the renovated brick elevation consisting of nine courses of London yellow stock brick (context 1068) (Fig. 9). The brick foundation below seems to extend to at least 3 m. **Context 1060** was noted over three courses and is consistent with the observations in Bay 1.

A second structure was recorded in this area, **context 1035** (Fig. 9), which is contemporary with the 18th century pier. It has been built into the foundation and consists of a row of red bricks on bed measuring 0.23 m x 0.11 m x 0.06 m bonded together with a hard sandy lime mortar with charcoal inclusions and fine gravels. The joints are fairly neat with a thickness of 2 cm. This structure seems to correspond to a floor level or a step for access into the bay area. However, due to the installation of a number cables and the presence of concrete it was impossible to excavate any further.

In this same bay a possible 18th century floor surface was also uncovered at a height of 8.11 m OD (**contexts 1036 and 1042**) (Figs. 9 & 11). **Context 1036** was composed of compacted reddish brown gravelly silt with a high concentration of sub-angular pebbles and stones, crushed brick, flecks of lime and mortar and some occasional tiles. It is conserved over a width of 2.6 m and was observed over a length of 1.45 m. It seems to “fill” an apparent linear trench (context **1039**) measuring 1.5 m x 0.4 m, and may be related to the partial removal of the limestone blocks **1041**. There is thus a dip in this otherwise flat deposit at this far western side of the bay dropping down to 8.05 m OD. The compacted nature of **1036** together with the presence of mortar/lime indicates that this corresponds to a preparation layer for a floor surface, and although no finds were uncovered we can be fairly certain that it is contemporary with the 18th century vaulting given the stratigraphic relationships. Furthermore, a very small *in situ* fragment of what appears to be floor render (**context 1042** - Fig. 11) was uncovered, measuring 0.1 m x 0.06 m. It is composed of a thin lime mortar base with fine stone inclusions, charcoal and coarse sand followed by a fine reddish brown render, and seems to provide further evidence that this is indeed an example of floor surface associated with the 18th century piers.

Contemporary Phase

In the 1960's a north-south aligned wall was constructed just a few centimetres to the east of **Wall 1008** which ran along the western side of the White Tower Shop. It was observed directly underneath the existing Yorkstone slabs at 8.17 m OD and is composed of two contexts including (**1018**) and (**1013**) (Fig. 5). **Context (1013)** is a mass of concrete exposed to a depth of 0.2 m and seems to correspond to the foundation level of the wall. Sitting directly on top, is the brick structure (**1013**), which is composed of greyish yellow machine cut bricks measuring 0.06 m x 0.12 m x 0.21 m. The joints are 2 – 3 cm thick and the bonding material is composed of hard concrete mortar that shrouds many of the bricks. The wall curiously bulges where it meets the brick foundations of the 18th century pier.



The archaeology is overlain by a layer of loose brick rubble 0.23 m thick that lay directly beneath the modern-day floor level, which has been used a levelling layer (contexts **1067, 1000, 1021, 1022, and 1045**).

5. **Archive, Artefacts and Ecofacts**

A small assemblage of pottery was uncovered during the course of the archaeological investigation consisting of fragments of medieval and post-medieval pottery; the full analysis of this assemblage can be found in section 6. A small collection of fauna and several small metal finds were also found including some unidentified bronze and iron objects and some large iron nails from contexts **1002** and **1043**. Two fragments of roof tile were uncovered in contexts **1025** and **1034** and a brick sample was also taken.

No environmental samples were taken.

The paper archive consists of: the context register and context/masonry sheets, the photographic register, drawn plans and sections, administrative documents and topographical maps.



6. Report on the Post-Roman Pottery

Prepared by Lucy Whittingham, AOC Archaeology Group

Introduction

A total of 34 sherds from 31 vessels (0.7 kg) divide into two periods of ceramic use; medieval and post-medieval. The sherds were recovered from 6 contexts, some of which are of a mixed date containing both early medieval and post-medieval fragments. The majority of the pottery is in small abraded pieces and therefore not necessarily within its primary location. A summary of the fabrics present within the assemblage is presented in Table 1.

The pottery has been recorded with reference to the Museum of London/LAARC fabric reference type series and quantified using sherd count and estimated number of vessels (ENV). Fabric type, vessel form and various attributes, such as decoration and glaze are also noted. A spot date has been calculated on the fabrics present in each context and applied to the stratigraphic phasing to corroborate the chronological sequence. The pottery records will be stored with the site archive under the sitecode TOL 154 at Historic Royal Palaces archive.

Period	Fabric	Sherd No	ENV	Wt (g)
Medieval	EMSS	1	1	7
	EMSH	1	1	2
	LOND	5	5	176
	MG	1	1	3
	KING	10	10	89
	CBW	2	2	12
	CHEA	5	2	24
	LLON	1	1	13
Post-medieval	SIEG	1	1	29
	CHEAR	1	1	8
	PMRE	2	2	263
	PMSRY	1	1	8
	PMR	2	2	14
	ENGS	1	1	5
	Total	34	31	653

Table 1 Summary of all pottery fabrics as number of sherds, ENV and weight by period

The medieval assemblage

Twenty nine sherds of medieval pottery form the main part of this assemblage (82%). These include a range of local wares ranging from early Saxo-Norman wares to late medieval London-



type ware and Surrey Whitewares, produced in London and the surrounding counties. The earliest pottery in the assemblage is represented by two small sherds of early medieval shell and sand tempered ware (EMSS) and early medieval shell-tempered ware (EMSH). These are small fragments from cooking pots dating from AD 1000/1050–1150 and thought to be produced close to the Thames perhaps in Southwark or Greenwich and from the Woolwich beds either in Southwark or in northwest Kent (Vince and Jenner 1991, 62–63; figs 2.38 and 2.44).

The majority of the vessels in this assemblage are fragments of jugs dating in fabric and form to c. 1270–1350. These are all relatively local products and all very common forms of jug found within London and the City assemblages. The fabric types are typical of locally produced London-type ware (LOND, 1080–1350), Surrey Whitewares; Kingston-type ware (KING, 1230–1400) and coarse Surrey/Hampshire border ware (CBW, 1270–1500) as well as Mill Green ware (MG, 1270–1350) from Essex. Within the London-type ware sherds several distinctive forms can be more closely dated. London-type ware baluster jugs commonly occur within the London ceramic sequence between 1180–1350 and are here represented by a large rod handle in context (1052) and a small sherd in context (1052), decorated with an applied vertical strip of white clay, possibly from a baluster jug with North French decoration dated as 1180–1270 (cf Pearce, Vince and Jenner 1985, fig 33). A further example is an inturned rim sherd with white slip decoration, in context (1043), from a later style tulip-necked baluster jug (LOND TUL, 1270–1350) with white slip on the external surface (cf Pearce, Vince and Jenner 1985, fig 37.126). One small handle, in context (1052) is from a London-type ware drinking jug such as in Pearce, Vince and Jenner 1985 (fig 64.306).

Within the Surrey Whitewares serving and drinking jugs are also the most common type of vessel. Of the ten Kingston-type ware sherds 6 with copper green-glazed are likely to be from 5 jugs and two unglazed from cooking pots. The only diagnostic fragments are two slightly thickened and inturned rim sherds, in contexts (1002) and (1043), which might be from the same small rounded jug (cf Pearce and Vince 1988, fig 81.172) and body sherds with combed or parallel horizontal incised lines, in context (1002).

Mill Green ware jugs are a common commodity in London between 1270–1350 (Pearce et al 1982, 272) and represented in this assemblage by one small sherd, in context (1025), with characteristic white slip under a copper-green glaze. This is most likely also from a jug, but too small a fragment to define further.

One single context (1034) appears to be markedly different being characterised by late medieval vessels in three distinctly late medieval fabrics. The large flared rim of an imported Siegburg trichterhalskrug dates from 1450–1550 (Hurst 1986, 179). This is a specific drinking vessel and could be considered as an imported vessel for use as tableware. The flat-topped rim of a coarse Surrey/Hampshire border ware (CBW) cooking pot is characteristic of a late medieval assemblage dated 1340–1500 (cf Pearce and Vince 1988, fig 94, no 308). The third element in this context is a fine whiteware jug sherd in Cheam Whiteware (CHEA) which is usually found in the City between 1350–1500.



The early post-medieval assemblage

An early post-medieval assemblage is represented by a closely-dated collection of domestic red earthenware vessels typical of late 15th to early 17th-century Tudor and Stuart London. These early post-medieval red earthenware fabrics form a small component (18%) of the assemblage. A single sherd in context (1025) can be identified by the reduced surface and painted slip decoration as a Cheam Redware (CHEAR) jug of 1480–1550. London-area early post-medieval redware (PMRE) is also represented by the base of a jug and the rim of a storage jar with thumbled cordon in context (1052). These are contemporary with a single jug in London-area post-medieval slipped redware (PMSRY) with a thick white slip and lead (yellow) glaze from the rim of a jug but of indeterminate form. These two early post-medieval wares date from 1480–1600/1650 and are associated with contexts (1002) and (1052). Two sherds of post-medieval red earthenware (PMR) dating from 1580–1900 are undiagnostic sherds with lead glaze found in context (1025).

Forms

This assemblage is dominated by tableware vessels (69%) associated with drinking or serving drinks such as beer or wine in both the medieval and post-medieval wares. Serving vessels are found in London-type ware and Mill Green ware baluster jugs, a London-type ware small drinking jug and small jugs in Kingston-type ware and Cheam Whiteware (Table 2). The one rim from an early post-medieval Siegburg trichterhalskrug was produced specifically as a drinking vessel, and though probably used as tableware was a relatively cheap import from the Rhineland. Fine tableware would have been made in other materials such as metal. In the early post-medieval redware jugs are also the most common form. One storage jar in London-area early post-medieval redware (PMRE) is the only vessel specifically associated with the kitchen and food preparation. Cooking wares (24%) are a minor part of this assemblage and primarily associated with the early Saxo-Norman wares (EMSS, EMSH) and the Surrey Whitewares (Kingston, coarse Surrey/Hampshire border ware).

	Fabric	Vessel Function	Sherd no	ENV	% of total
M	LOND	DRINK/SERVE	5	5	
M	KING	DRINK/SERVE	6	6	
M	CHEA	DRINK/SERVE	4	1	
M	MG	DRINK/SERVE	1	1	
EPM	SIEG	DRINK/SERVE	1	1	
EPM	CHEAR	DRINK/SERVE	1	1	
EPM	PMRE	DRINK/SERVE	1	1	
EPM	PMSRY	DRINK/SERVE	1	1	
EPM	PMR	DRINK/SERVE	1	1	
		subtotal	21	18	72%
M	EMSS	COOKING	1	1	
M	EMSH	COOKING	1	1	
M	CBW	COOKING	2	2	



M	KING	COOKING	2	2	
		subtotal	6	6	24%
EPM	PMRE	STORAGE	1	1	4%
		total	28	25	

Table 2 Summary of vessel functions

Discussion

The pottery assemblage from this site is of a mixed broad date range containing at the earliest Saxo-Norman wares dating from 1000–1150, to late medieval (1450–1500) and early post-medieval wares (1580-1600/50). The majority of the material in this assemblage is from small abraded sherds which suggest that the majority of this assemblage is not within its primary place of deposition. However, it is the smaller assemblage of early post-medieval material which confirm the stratigraphic sequence and indicate that of the six pottery assemblages three are contemporary with the Tudor walls excavated in Bays 1 (context 1002) and 3 (context 1034) and a Tudor floor level in Bay 2 (context 1025). The Tudor date of the walls is indicated by the pottery as late 15th to mid-16th century; context (1034) as 1450–1550 and context (1002) as 1480–1650. Both of these features could be considered as contemporary between 1480–1550. However, the floor layer in context (1025) is slightly later dating from c.1580 to 1650? The significant late medieval to early post-medieval fabrics which can be associated with these Tudor features are the imported Siegburg trichterhalskrug (SIEG), coarse Surrey/Hampshire border ware (CBW), Cheam Whiteware (CHEA), and red earthenware fabrics from Cheam (CHEAR) and the London region (PMSRY, PMR).

The Saxo-Norman pottery is residual in both contexts (1043) and (1052) as is all of the medieval pottery in this assemblage. It is worth noting that the medieval period of c.1270–1350 is well represented by a typical suite of vessels bought from successful industries within the surrounding counties of Surrey (Kingston upon Thames and Cheam) and Essex (Mill Green). All of these fabrics and vessel forms are typical of City of London assemblages, though such a broad spectrum of dates represented in a small assemblage suggests that there is a degree of disturbance in the stratigraphy. The small abraded size of the majority of sherds is also an indicator that these pieces are not necessarily within their primary location and that the stratigraphy has been disturbed by later intrusion, for example context (1025) which contains Saxo-Norman pottery, medieval and early post-medieval pottery dating from 1480–1600 but is stratified above the 18th-century White Tower piers. Context (1001) contains only one medieval sherd of c.1230–1400 which is residual in its stratified association with the Tudor wall in Bay 1.

The late 18th -century piece of English stoneware in the Tudor floor level (context 1025) is intrusive and can be explained by the overlying 18th -century piers, associated with the construction of the White Tower vaults in 1732-34, which have probably disturbed the underlying floor level.



Illustration/photography

None of the sherds in this assemblage are recommended for illustration.

Preparation for archive deposition

All of the pottery is packed and recorded ready for archive deposition.

Conservation requirements

There are no conservation requirements for this pottery assemblage.

7. Synthesis

The White Tower Shop renovations have provided a rare opportunity to investigate the underlying archaeology in the basement of the western side of the White Tower. It revealed the presence of two Tudor brick walls running north-south, which would seem to correspond to the narrow linear features shown in TNA Work 31/84 (Fig. 14), as well as a small segment of linear stone masonry butting up against the western wall of the White Tower. This masonry may also have been marked on the same plan, but does not appear to be of Tudor construction (see Fig.10).

Although there is limited written evidence for their existence and purpose, with the plans from TNA Work 31 being the only known primary references, the archives produced as a result of the works in 1968 and 1998 do provide us with some useful data which we can add a much more substantial record.

Together with the analysis of the small pottery assemblage, we can thus put forward a number of possibilities as to the function and date of the identified features. The present investigation clearly shows that these walls were demolished when the vaults were installed in 1732-34 with systematic signs of truncation along the whole length of these features. Moreover, it seems certain that the sections of wall revealed on both the western and the eastern side of White Tower Shop correspond to these enigmatic structures as they closely match the surviving plans. Added to this is evidence from the OAU 1998 Watching Brief (ToL75), which unveiled a north-south aligned brick wall at the northern end of the western room of the White Tower basement. This was interpreted as a post-medieval spine wall and would seem to correspond to wall 1024 in Bays 2 and 4. It was suggested too that it was related to Lemprière's 1729 cross-section of the White Tower, which clearly shows posts rising through all levels of the western



half of the building, and that it may be a sleeper wall used to support these uprights. However, it was also suggested that the wall may date to the 17th century based on the morphology of the bricks, but given the additional information gathered during the present project this tentative claim can be contested. Moreover, in a letter from Stephen Brindle to Martin Caroe dated 21 May 1997, the brick work found in the basement during the Watching Brief of that year was described as “a mass of Tudor brickwork, which is probably the footings of timber columns inserted into the building in the 1530’s (ref: Job No. 853/100). A further letter found among the archives also refers to the discovery as Tudor masonry, dated 28 February 1997 addressed to Paul Sharrock from Geoffrey Parnell.

Based on the form and size of the bricks, together with the presence of a small but nonetheless closely dated assemblage of domestic earthenware vessels from the late 15th to the early 17th century associated particularly with contexts 1025 and 1002, we can safely assume that walls 1008 and 1024 are Tudor in date. The linear structures on the Board of Ordnance map are punctuated with post structures along their length, which suggests that the brick walls discovered, as already suggested by the OAU personnel during the 1998 Watching Brief, may have been sleeper walls supporting posts that reinforced the floors above. Yet no post-hole features were found during the archaeological investigations. The only possible element that may correspond was an interruption in the brick construction on the surface of wall 1008 in Bay 1. This could indicate that the potential posts or uprights may have been held in place by stone footings placed on the floor level and built into this space in the wall.

Curiously, the depths of the two walls (1008 and 1024) do not correlate. Wall 1008 on the west, plunges to 0.74 m in depth whilst conversely wall 1024 on the eastern side, is a mere 0.34 m in depth. However, it should be remembered that only a small section of both walls were excavated to the base of their foundations and it would seem, according to the Watching Brief in 1998 (ToL75), at least wall 1024 is not consistent in terms of its depth along the whole length. OAU excavated 7 courses of this wall down to 7.82 m OD; whilst adjacent to the medieval well this same wall (context 1024) had a maximum of depth of 0.3 m with five courses of brick and height of 7.87 m OD at the base. Conversely, photographic evidence from the 1968 evaluation of the basement seems to indicate, as far as is possible to see, that wall 1008, on the western side of this part of the basement, does not vary in terms of its depth (Fig.14).

During the Tudor period, several phases of structural works were carried out on the White Tower – however, documentary evidence of these events varies considerably (Impey, 2008 pp. 161-174). One such programme which lacks written evidence was Henry VII’s work to raise the roofs of the east and west rooms of the White Tower, making them a full storey higher than they were when originally built. Structural evidence shows that this was also accompanied by the insertion of new floors creating second floors in the east and west rooms. Despite the succession of rebuilds the floors have undergone over the centuries, the remains of earlier floorboards were uncovered



and subsequently dated to 1488 (Impey, 2008, p.161). Bearing this in mind, it would seem logical to reinforce the underpinning for this additional structural element, and the insertion of solid brick wall foundations could well be part of this whole phase of renovation during the late 15th century. Therefore it is possible that walls 1008 and 1024 and their associated contexts, including the potential Tudor floor tile 1050, could be linked with this specific time period; a hypothesis which is further supported by the early post-medieval pottery assemblage in contexts 1025 and 1002.

The small section of stone masonry, 1041 (Figs. 2, 9 & 10) is even more enigmatic by nature, especially as only a small section was uncovered, leaving little room for interpretation. It seems to have been partially robbed out to the south, probably during or just prior to the 18th century given that the possible floor level related to the piers overlies the cut. The masonry is fairly rough in appearance with a depth of only 0.18 m. One interesting observation is the fact that it does appear on the same alignment as a linear feature running alongside the western wall of the White Tower in TNA Work 31/84 (Fig. 15). The feature, as recorded on this plan, contains postholes similar to the walls already identified to the east. It could correspond to this feature but too little was excavated to be certain of its function and no postholes were identified. The lack of brick use suggests that it could predate the Tudor features, and may have been re-used to support the later floors above. This is a speculative conclusion, and until further excavations become possible during any future renovations, this will remain a feature of unknown function.

The excavation also allowed for some observations to be made regarding the 18th century installations. This arrangement is well-recorded through surviving features such as the brick vaults, as well as detailed drawings (TNA Work 31/ 95). By the 1750s, both the western and eastern rooms of the basement were being used as saltpetre stores, with the material stored in the centre of the room in bays. A narrow passage-way ran around the western, eastern and northern perimeters and was cut through the brick vaults to allow access into the bays, with entry into the main storage area through wooden doors running north-south between the vaults.

Interestingly, it seems that part of the foundations for the 1730's piers were constructed with re-used Tudor bricks, which must originate from the demolished walls described above. A possible floor level was also uncovered in Bay 3 (1036, 1042), which seems to be composed of a metled preparation layer and mortar surface. According to Impey (2008, p.190), in 1714-1715, and prior to the major renovation of the basement, both the east and west rooms were laid with deal boarding on the floors and walls, and the west room was fitted up to hold saltpetre purchased from the East India Company. It was indeed due to the security of this saltpetre that the decision to vault the basement in the 1730s was taken.



Although deal boarding was used for the floor surface back in the early 18th century, there is no description of the type of floor used once the vaulting had been installed. Perhaps simple mortar flooring sufficed? It would certainly have been fairly fire resistan



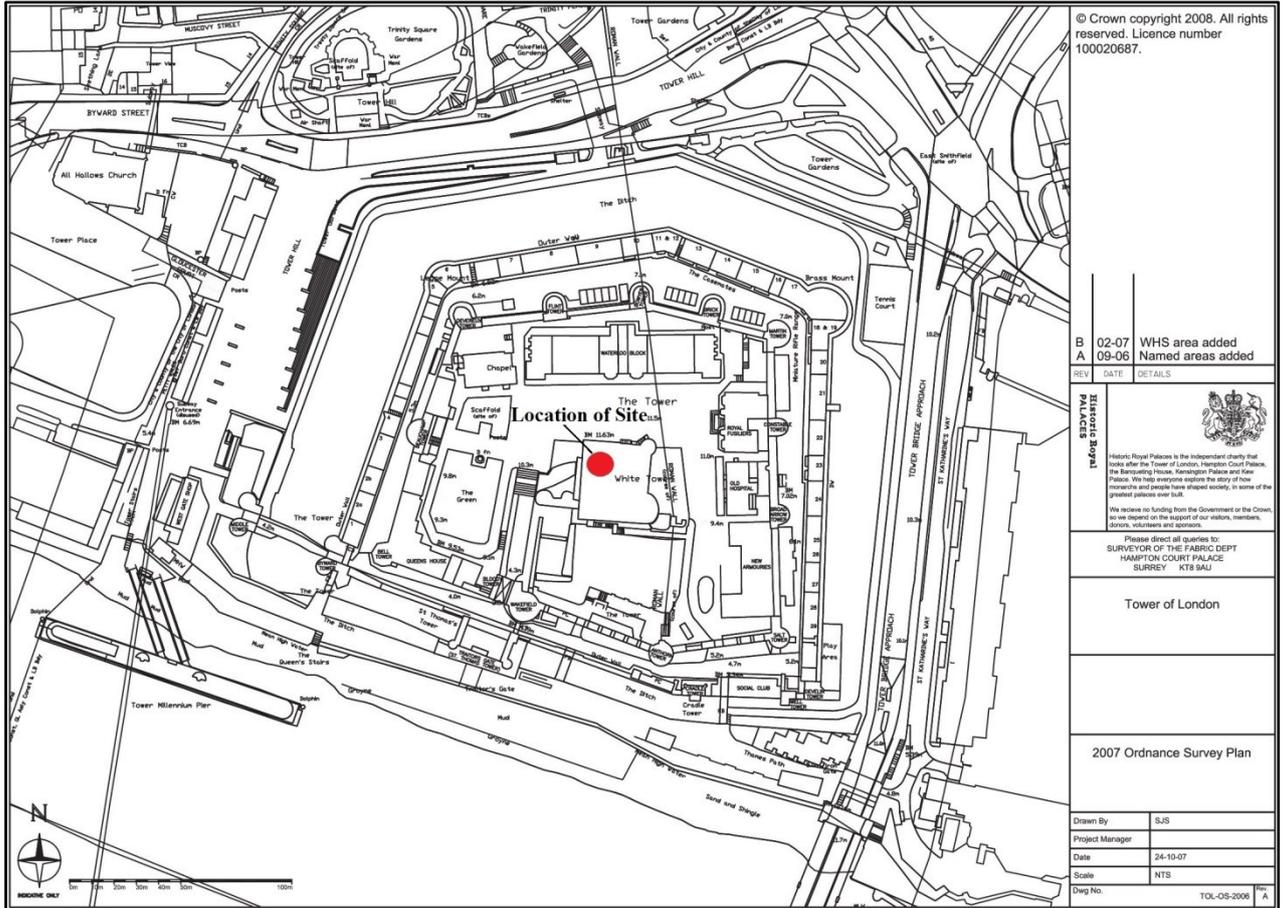


Figure 1: Location of the site



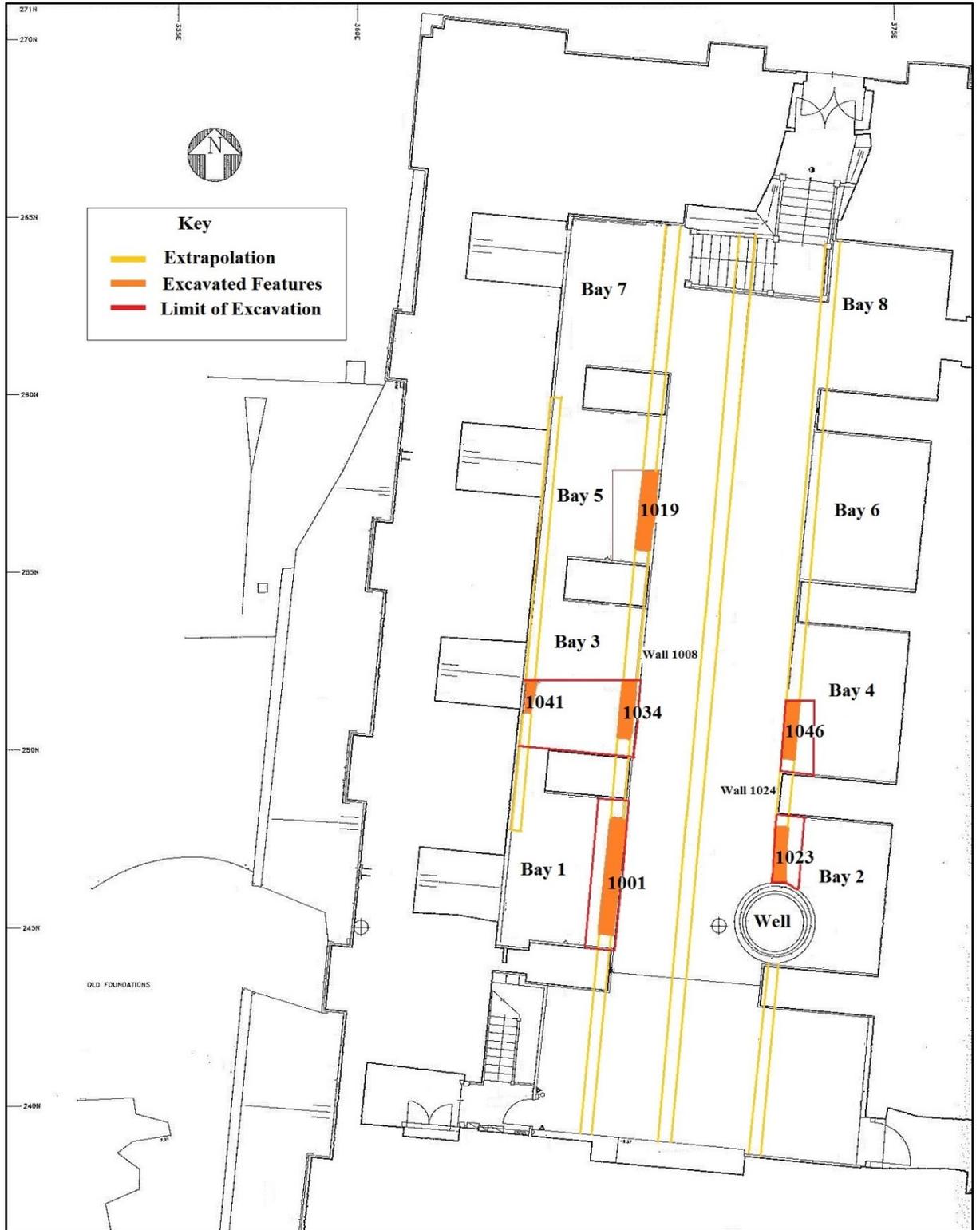


Figure 2: Location of excavated areas and mains excavated features





Figure 3: Contexts 1001 and 1006 - west-facing elevation



Figure 4: View in plan of 1001 showing the interruption in the construction of the wall





Figure 5: Wall 1008 in Bay 1, looking towards the north



Figure 6: Contexts 1017, 1013, and 1014 in Bay 1



Figure 7: West-facing view of Bay 2





Figure 8: East-facing elevation of wall 1024 (context 1023) in Bay 2



Figure 9: Bay 3, looking towards the south



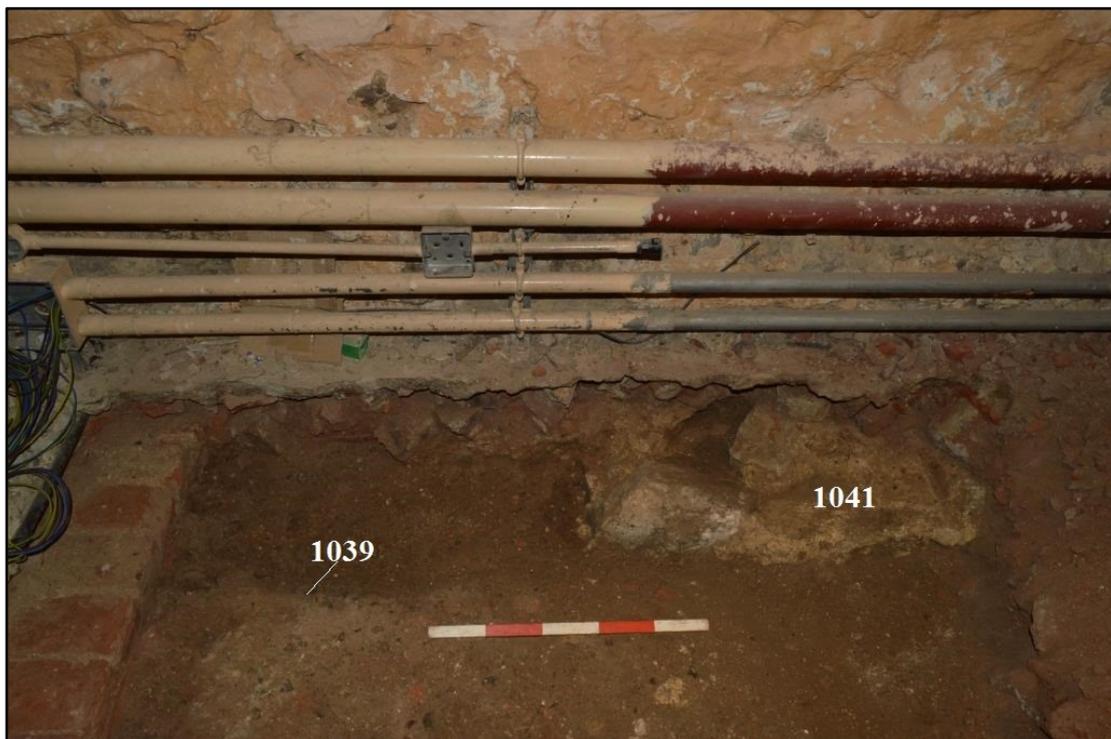


Figure 10: Contexts 1041 and 1039 in Bay 3, looking towards the west





Figure 11: Detail shot showing context 1041



Figure 12: Bay 4 looking towards the west



Figure 13: Wall 1008 (context 1019), in Bay 5, looking towards the south





Figure 14: "Tudor wall footings in cannon room" (1968) [Historic England, AL 1087 A 7479/4]



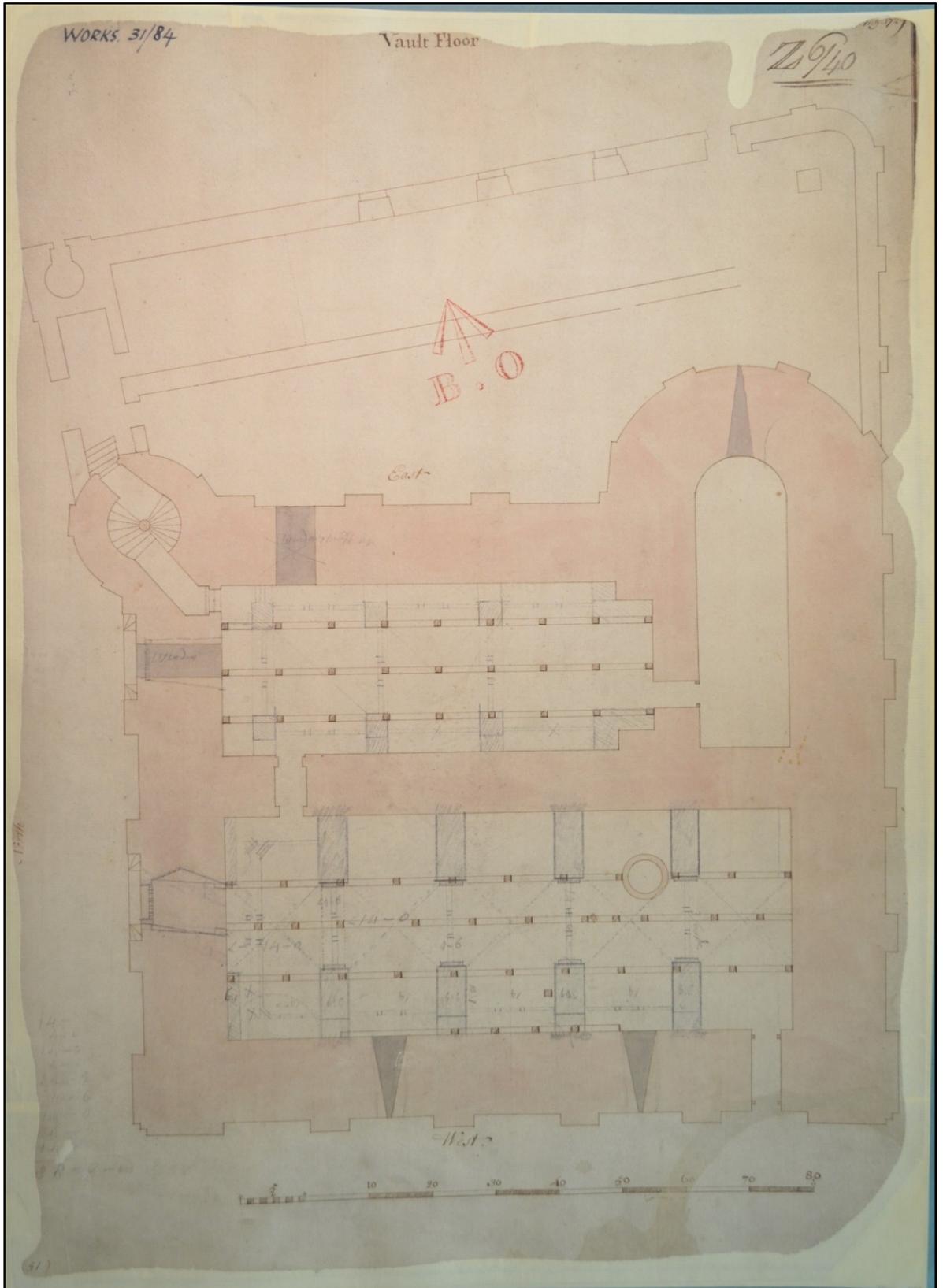


Figure 15: White Tower, vault plan showing internal timber construction, (1729) – [TNA Work 31/84



Appendix I:

Context Inventory

Context	Bay	Type	Description	Levels OD
1000	1	Layer	Contemporary brick rubble levelling	High: 8.25 Low: 8.13
1001	1	Masonry	N-S Tudor brick wall elevation, part of 1008.	High: 8.13, Low: 7.94
1002	1	Deposit	Loose sandy deposit	High: 8.13, Low: 7.89
1003	1	Cut	Foundation trench cut for 1020, 1006, 1001, part of 1008	High: 7.82, Low: 7.38
1004	1	Fill	Fill of construction cut 1003, part of 1008	High: 7.82, Low: 7.38
1005	1	Deposit	Compacted gravelly deposit	High: 7.89, Low: 7.79
1006	1	Masonry	Wall foundation, part of 1008.	High: 7.94, Low: 7.63
1007	1	Deposit	Thin layer of brick and rubble between 1002 and 1005.	High: 7.98, Low: 7.89
1008	1,3,5	Group	North-south wall grouping 1034, 1003, 1020, 1006, 1001, 1004, 1019.	High: 8.13, Low: 7.39
1009	1	Cut	Construction cut for 18th century pier (north of Bay 1)	High: 7.97
1010	1	Fill	Fill of construction cut 1009.	High: 7.97
1011	1	Cut	Construction cut for 18th century pier (south of Bay 1).	High: 7.97
1012	1	Fill	Fill of construction cut 1011.	High: 7.97
1013	1	Masonry	Contemporary north-south brick wall.	High: 8.18
1014	1	Masonry	Yorkstone slab flooring.	High: 8.27, Low: 8.20
1015	1	Layer	Thin layer of packing sand	High: 8.30, Low: 8.27
1016	1	Masonry	Yorkstone slabs current floor level.	High: 8.37, Low: 8.00
1017	1	Masonry	Brick foundation for 18th century piers.	High: 8.31
1018	1	Masonry	Concrete foundation level below 1013.	High: 7.96
1019	5	Masonry	North-south brick wall – part of group 1008.	High: 8.13
1020	1	Masonry	Lower footing below 1006 – part of 1008.	High: 7.63, Low: 7.39
1021	5	Layer	Contemporary brick rubble layer	
1022	2	Layer	Contemporary brick rubble layer	High: 8.24, Low: 8.04
1023	2	Masonry	North-south Tudor brick wall, part of 1024.	High: 8.17, Low: 7.87



1024	2,4	Group	North-south brick wall comprising of 1023 and 1046.	High: 8.18, Low: 7.87
1025	2	Layer	Possible earth floor level.	High: 8.03
1026	2	Cut	Construction cut for 18th century pier.	High: 7.93
1027	2	Fill	Fill of construction cut 1026.	High: 7.93
1028	2	Layer	Contemporary concrete above 1022.	High: 8.31
1029	2	Masonry	Yorkstone slab flooring.	High: 8.37, Low: 8.28
1030	2	Masonry	Brick foundation for 18th century pier.	High: 8.27
1031	2	Masonry	Limestone lining of medieval well.	High: 8.14
1032	2	Layer	Contemporary concrete make-up layer above the medieval well.	High: 8.29
1033	2	Deposit	Dump layer.	High: 8
1034	3	Masonry	North-south Tudor brick wall, part of 1008.	High: 8.1
1035	3	Masonry	Brick structure associated with 18th century pier.	High: 8.21
1036	3	Layer	Mettled surface.	High: 8.11
1037	3	Cut	Construction cut trench for 18th century pier.	High: 8.04
1038	3	Fill	Fill of construction trench 1037.	High: 8.04
1039	3	Cut	Possible cut for robber trench.	High: 8.11
1041	3	Masonry	Linear composed of roughly hewn limestone blocks.	High: 8.13, Low: 7.95
1042	3	Masonry	Mortar floor remnants	High: 8.12
1043	3	Deposit	Soil horizon below 1036, truncated by 1037, abuts 1034	High: 8.04
1044	4	Deposit	Loose sandy silt deposit above 1049.	High: 8.16, Low: 8.13
1045	4	Layer	Contemporary rubble levelling layer.	High: 8.18, Low: 8.25
1046	4	Masonry	North-south Tudor brick wall part of 1024.	High: 8.18
1047				
1048	4	Cut	Construction cut for 18th century pier.	High: 8.12
1049	4	Fill	Fill of construction cut 1048.	High: 8.12
1050	4	Masonry	Limestone slab and possible remains of a floor.	High: 8.13
1051	4	Deposit	Loose gravelly deposit above 1046.	High: 8.09
1052	1	Deposit	Loose backfill above 1013 and against 1014.	High: 8.18
1053	5	Deposit	Backfill, same as 1052	High: 8.18
1054	5	Cut	Construction cut for pier.	High: 8.10
1055	5	Fill	Fill of construction cut 1054.	High: 8.10
1056	5	Layer	Modern sandy deposit abutting 1019	High: 8.12



1057	5	Masonry	Yorkstone slab flooring.	High: 8.36, Low: 8.29
1058	5	Layer	Sandy layer between 1057 and 1059.	High: 8.28, Low: 8.25
1059	5	Masonry	Yorkstone slab flooring.	High: 8.25, Low: 8.16
1060	3	Masonry	Brick foundation of 18th century pier.	High: 8.27
1061	1	Deposit	Loose lime and mortar deposit	High: 8.07
1062	4	Masonry	Yorkstone slab flooring.	High: 8.35, Low: 8.28
1063	4	Layer	Concrete layer.	High: 8.29
1064	3	Masonry	Yorkstone slab flooring	High: 8.35, Low: 8.28
1065	3	Layer	Sandy layer under 1064.	High: 8.28, Low: 8.25
1066	3	Masonry	Yorkstone slab under 1065	High: 8.25, Low 8.19
1067	3	Layer	Brick rubble layer.	High: 8.30, Low: 8.10
1068	3	Masonry	Brick elevation of pier.	Low: 8.21
1069	3	Masonry	Concrete render overlaying 1068.	High: 8.12



Photographic register

Photo No	Description	View	Scale
1	General view of White Tower Shop before commencement of work	N	N/A
2	General view of Bay 1 prior to works	W	N/A
3	General view of Bay 2 prior to works	E	N/A
4	General view of Bay 2 prior to works	E	N/A
5	General view of Bays 4 and 6 prior to works	NE	N/A
6	General view of Bay 4 prior to works	NE	N/A
7	General view of Bay 3 prior to works	NW	N/A
8	General view of Bay 1 prior to works	NW	N/A
9	General view of White tower shop prior to works	N	N/A
10	Bay 1	NW	N/A
11	Bay 3	NW	N/A
12	Trial trench in bay 1 with rubble layer 1000	E	0.5 m
13	General view of trial trench Bay 1	E	0.5 m
14	General view of trial trench Bay 1	E	0.5 m
15	Wall 1008 in Bay 1 context 1001	E	0.5 m
16	Wall 1008 in Bay 1 context 1001	E	0.5 m
17	Wall 1008 in Bay 1 context 1001	E	0.5 m
18	Wall 1008 in Bay 1 context 1001	E	0.5 m
19	Wall 1008 in Bay 1 context 1001	E	0.5 m
20	Wall 1008 in Bay 1 context 1001	E	0.5 m
21	Wall 1008 in Bay 1 context 1001	S	0.5 m
22	Wall 1008 in Bay 1 context 1001	S	0.5 m
23	Elevation 1001 and footing 1006 of wall 1008 in Bay 1	E	0.4 m
24	Elevation 1001 and footing 1006 of wall 1008 in Bay 1	E	0.4 m
25	Elevation 1001 and footing 1006 of wall 1008 in Bay 1	E	0.5 m
26	Elevation 1001 and footing 1006 of wall 1008 in Bay 1	E	0.5 m
27	Elevation 1001 and footing 1006 of wall 1008 in Bay 1	E	0.5 m
28	View in plan of wall 1008 in Bay 1	N/A	0.5 m
29	View in plan of wall 1008 in Bay 1	N/A	0.5 m
30	Section 101	N	0.5 m
31	Section 101	N	0.5 m
32	Wall 1008, Bay 1	N	0.5 m
33	General view of Bay 1	SW	N/A
34	View of wall 1008 in Bay 1	N	0.5 m
35	View of wall 1008 in Bay 1	E	0.5 m
36	View of wall 1008 in Bay 1	N	0.5 m
37	View of wall 1008 in Bay 1	N	0.5 m
38	Section of wall 1008 in Bay 1	E	0.5 m
39	General view of Bay 1 and wall 1008	NE	0.5 m



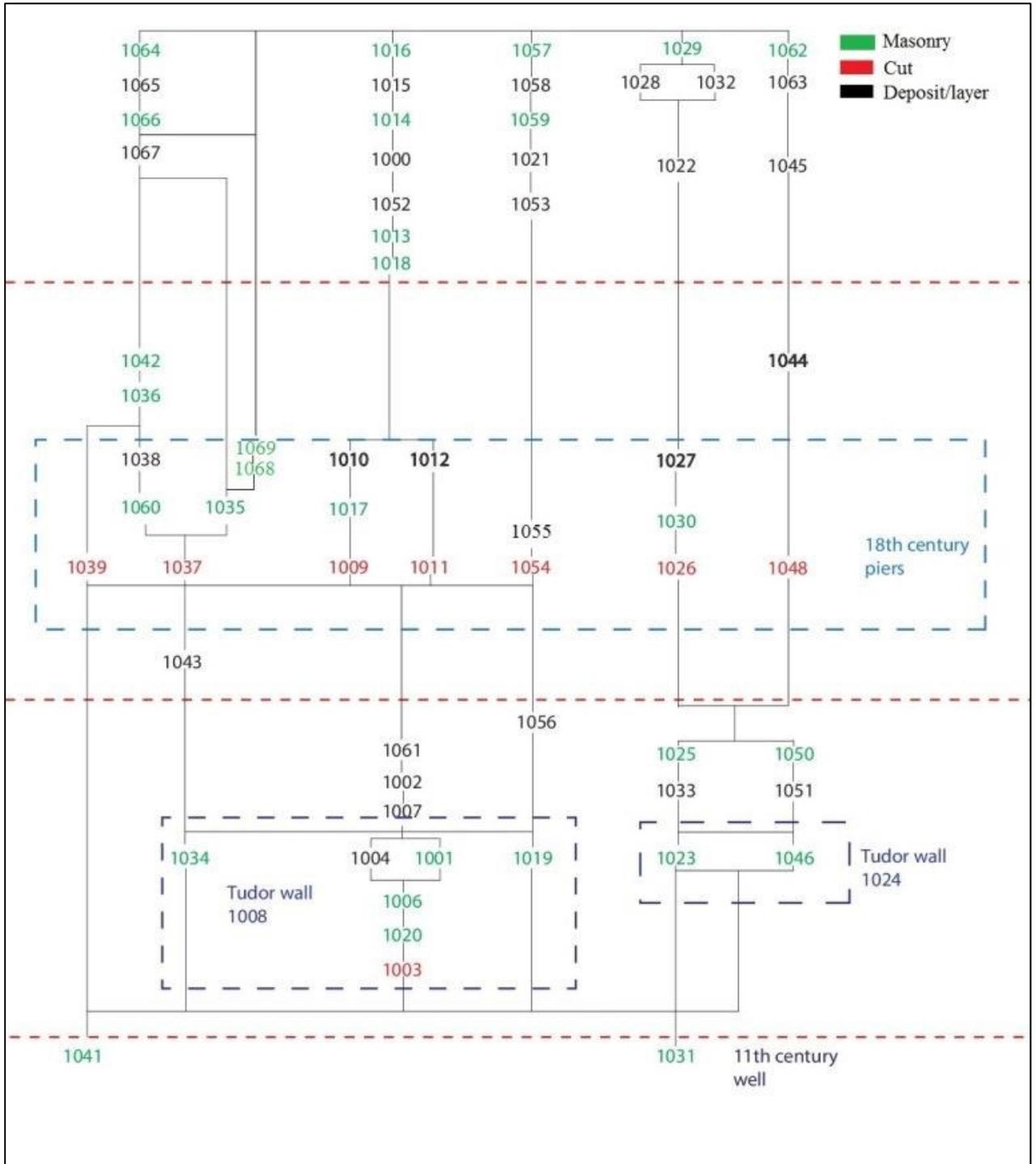
40	Detail of elevation 1001	E	0.4 m
41	Elevation 1001	S	0.4 m
42	Detail of elevation 1001 in plan	N/A	N/A
43	Brick foundation of 18th century pier, 1017	S	0.4 m
44	Brick foundation of 18th century pier, 1017	S	0.4 m
45	Relationship between 1017 and 1013	NE	0.4 m
46	General view of 1008, 1017 and 1013	NE	0.4 m
47	Wall 1008 in section	E	0.4 M
48	General view of Bay 1	NW	N/A
49	Detail of 1013	E	0.4 m
50	Shot of 1008, showing depth	N/A	0.4
51	Shot showing depth of 1008	E	N/A
52	Wall 1008 in Bay 5, context 1019	S	0.5 m
53	Wall 1008 in Bay 5, context 1019	S	0.4 m
54	General view of Bay 5 and 1019	SW	0.4 m
55	Working shot in Bay 2	N/A	N/A
56	Working shot in Bay 2	N/A	N/A
57	Working shot in Bay 2	N/A	N/A
58	Working Shot in Bay 2	N/A	N/A
59	Working shot in Bay 2	N/A	N/A
60	Bay 2, contexts 1037, 1023, 1025	W	0.5 m
61	Bay 2, contexts 1037, 1023, 1025	N	0.5 m
62	Bay 2, contexts 1037, 1023, 1025	N	0.5 m
63	Bay 2, contexts 1031, 1025	N	0.5 m
64	Bay 2, contexts 1031, 1025	S	0.4 m
65	Elevation 1023 in section and 1031	W	N/A
66	General view of Bay 2	W	N/A
67	Elevation 1023	W	N/A
68	General view of Bay 2	W	N/A
69	Bay 2, contexts 1025, 1031, 1023	S	0.5 m
70	Context 1031 in profile	S	0.2 m
71	Context 1031 in profile	S	0.2 m
72	Context 1031 in profile	S	0.2 m
73	Bay 2	W	0.5 m
74	Detail of 1023 in section	W	0.3 m
75	Bay 2, contexts 1031, 1023	W	0.3 m
76	Bay 2, showing depth of 1023	W	0.3 m
77	Small sondage in Bay 2	S	0.3 m
78	Small Sondage in Bay 2	S	0.3 m
79	Elevation 1023, part of wall 1024	W	0.3 m
80	Bay 3, contexts 1041, 1036, 1034	SW	0.5 m
81	Bay 3, contexts 1041, 1036, 1034	SW	0.5 m
82	Context 1034	N	0.5 m
83	Detail of 1036	E	0.15 m
84	Detail of 1036	E	0.15 m
85	Context 1035	S	0.4 m
86	Context 1035 and 18th century pier	S	0.4 m
87	General view of Bay 3	S	0.5 m
88	Detail of 1036	W	0.5 m
89	Detail of 1036	S	0.5 m



90	Bay 3, context 1036	S	0.5 m
91	Detail of 1041	E	0.4 m
92	Detail of 1041	E	0.15 m
93	Contexts 1041 and 1039	S	0.4 m
94	Contexts 1041 and 1039	E	0.5 m
95	Detail or relationship between 1035 and 1060	S	N/A
96	Detail of relationship between 1035 and 1060	S	N/A
97	Detail of 1042	N	N/A
98	Detail of 1042	N	N/A
99	Bay 4, contexts 1050, 1046	E	0.5 m
100	Bay 4, contexts 1050, 1046	E	0.5 m
101	Bay 4, contexts 1050, 1046	E	0.5 m
102	Detail of 1050	S	N/A
103	Detail of relationship between 1050 and 1046	S	N/A



Stratigraphic Matrix



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